THE BIG PUSH THEORY AND INFRASTRUCTURAL DEVELOPMENT IN NIGERIA

Odeworitse Meshach Edema

Department of Economics, Dennis Osadebay University, Asaba, Delta State, Nigeria

Email: odeworitse.edema@dou.edu.ng

ABSTRACT

Good infrastructure is widely recognised as a cornerstone of economic development in emerging economies. In Africa, and particularly in Nigeria, limited financing has discouraged investment, reduced productivity, and exacerbated poverty and inequality. Despite repeated government interventions, capital formation remains persistently low, leaving Nigeria's infrastructure lagging behind that of comparable nations. Existing research confirms that sustained capital growth requires public capital expenditure (PCE), foreign direct investment (FDI), official development assistance (ODA), and strong institutional quality (IQ). However, few studies have examined these determinants collectively within a single framework such as the Big Push Theory. This theory posits that a coordinated set of investments is necessary to generate the synergistic effects that drive continuous economic growth. This study investigates the main factors influencing capital formation in Nigeria and evaluates whether current investment patterns align with the Big Push Theory. Employing a quantitative approach, regression analysis was conducted to examine the relationship between Gross Fixed Capital Formation (GFCF) and its determinants. The findings reveal that PCE has a negative and statistically significant relationship with GFCF, while FDI, ODA, and IQ exhibit positive and significant impacts. These results underscore the importance of institutional quality, foreign aid, and historical investment momentum, while highlighting inefficiencies in public spending and weak integration with foreign investment. The study concludes that for Nigeria to effectively pursue a Big Push development strategy, reforms must prioritise not only mobilising financial resources but also strengthening institutions and improving the quality of investments.

Keywords: Big Push Theory, Capital Formation, Foreign Direct Investment, Institutional Quality.

INTRODUCTION

Background

Good infrastructure is often recognised as key to the economic development of many emerging countries (Calderón & Servén, 2010; Susantono & Berawi, 2015). It helps get work done, reduces the cost of doing business, and encourages industrialisation and increased trade. In 1943, Rosenstein-Rodan introduced the Big Push Theory, arguing that significant investments in both infrastructure and business are required to help developing countries avoid indivisibilities and other factors that cause low growth (Rosenstein-Rodan, 1943). Based on this theory, staggered or incremental investments may fail to lead to lasting economic change.

Applying the Big Push approach seems appropriate for Nigeria. Being Africa's most prosperous country does not stop Nigeria from experiencing problems with infrastructure services such as water, sanitation, transport and electricity (World Bank, 2020). The limited financing in these African economies discourages investment, reduces productivity, and increases poverty and inequality (AfDB, 2018). According to the National Integrated Infrastructure Master Plan, a budget of over $100 billion per year is needed to achieve Nigeria's target development by 2040. However, the government is not spending nearly as much (FGN, 2015).

Even after various attempts by governments, capital formation remains low in Nigeria, and the country's infrastructure fails to match that of comparable countries. The results from studies conducted by Owusu-Manu et al. (2019), Bakar and Mat (2017), Sherkulovich (2015), Ismail and Mahyideen (2015) and Maryaningsih et al. (2014) indicate that infrastructure contributes to the recovery of economic growth.

Even though several studies link infrastructure to Nigeria's development, few have specifically examined the drivers of capital formation in Nigeria through the lens of the Big Push Theory. This study aims to examine the main factors affecting capital formation in Nigeria and to assess whether the country's investment patterns align with the Big Push Theory.

To provide solutions to the identified problems, the following research objectives are set for the study:

1. To investigate the effect of public capital expenditure on gross fixed capital formation in Nigeria.
2. To examine the influence of foreign direct investment (FDI) inflows on gross fixed capital formation.
3. To assess the impact of official development assistance (ODA) targeted at infrastructure on gross fixed capital formation.
4. To determine the influence of institutional quality and governance on gross fixed capital formation in Nigeria.

In line with the above objectives, these are the research questions to be addressed by this study:

1. How does public capital expenditure influence gross fixed capital formation in Nigeria?
2. What is the impact of foreign direct investment inflows on gross fixed capital formation?
3. Does official development assistance directed at infrastructure significantly affect gross fixed capital formation?
4. To what extent does institutional quality or governance affect gross fixed capital formation in Nigeria?

Further to the research questions, the answers provided will be guided by these hypotheses:

1. $\mathbf{H_1}$: Public capital expenditure has a significant positive effect on gross fixed capital formation in Nigeria.
2. $\mathbf{H_2}$: Foreign direct investment inflows significantly increase gross fixed capital formation.
3. $\mathbf{H_3}$: Official development assistance directed at infrastructure has a positive effect on gross fixed capital formation.
4. $\mathbf{H_4}$: Institutional quality and governance have a significant effect on gross fixed capital formation in Nigeria.

This study contributes to knowledge by incorporating the basic assumptions of the Big Push Theory into a framework for infrastructure development in Nigeria. Using data and statistics, it uncovers the main factors that influence capital formation. The study also addresses the existing gaps in the literature. In terms of policies, the study provides insights for building infrastructure that supports Nigeria's national development.

This paper is structured into five sections. Section 1 is the introduction, which sets the stage for the research by highlighting the background, problem, objectives, questions, and hypotheses, as well as the research's significance. Section 2 will cover the theoretical framework and literature review for the research, highlighting the theoretical framing, conceptual definitions, empirical literature review, and research gaps. Section 3 will discuss the overall methodology for the research. Section 4 presents the results and discussion, comparing them with the findings of previous studies. Finally, the research will be synthesised in Section 5, which will also offer policy recommendations based on the research findings.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical Framing: The Big Push Theory

According to the Big Push Theory, which was put forth by Paul Rosenstein-Rodan in 1943, significant obstacles to growth in developing nations must be removed through extensive, well-coordinated investments.

Rosenstein-Rodan (1943) argued that, because of an economy's indivisibilities and synergies, small, independent investments are inadequate to spur significant economic growth.

According to the hypothesis, to generate a synergistic impact that can drive an economy towards continuous growth, an organised group of investments is required. The Big Push Model's central tenet is that numerous sectors and industries have complementary linkages, which means that the expansion of one can spur the growth of others (Rodrik, 2013). This theory emphasises the importance of comprehensive investment strategies across Nigeria's agricultural, industrial, and service sectors to promote equitable and balanced economic development (Todaro & Smith, 2015).

According to the Big Push Theory, several market flaws, including inefficiencies and organisational failures, impede the progress of developing countries. According to Opuala-Charles et al. (2025), this implies that significant government planning and intervention are necessary to address these market failures and create an environment that encourages private-sector investment. However, one drawback of the theory is that it assumes the government can successfully plan and execute significant investments, which is not always possible due to institutional flaws and corruption (Murphy et al., 1989; Currie, 2018). Nevertheless, this theory is significant to this study in that it suggests that, to help underdeveloped countries like Nigeria, with many infrastructure gaps, rise out of poverty, various large-scale efforts by the government, support institutions, and investments are important to build capital, mainly for infrastructure and industry.

Conceptual Definitions

Big Push Investment:

When a government makes a big push for investment, it allocates resources strategically across different economic sectors to address the main issues that prevent a nation from growing. Originating in Rosenstein-Rodan's (1943) theory, this concept holds that the foundations of economic growth in poor countries include significant investments in infrastructure and industry, as well as improvements in the education of the population. According to the theory, when different sectors support one another, it leads to higher sales, lower costs, and growth through large-scale production (Todaro & Smith, 2020). Big Push Investment in the Nigerian context focuses on building key infrastructure in energy, transport, and internet access to initiate industrial growth and raise productivity in the economy (Adegbite, 2021). Unlike single, small-scale investments, this strategy can work for economies struggling with low capital levels and weak institutions.

Infrastructural Development:

According to Bertha (2007), infrastructure development entails improving the quality of infrastructure elements such as roads, electricity, sanitation, and information and communications technology. It appears this concept prioritises complex infrastructure while ignoring soft infrastructure. Infrastructure development, according to Spacey (2018), is the creation of the essential services that promote economic expansion and the standard of living. In this case, the soft side of infrastructure is highlighted. Asaju (2023) defines infrastructure development as the availability of those concrete structures that support and improve the delivery of core services necessary for the economy's sustainability and resilience, as well as for enhancing the general well-being of the populace.

Hence, infrastructural development can be conceptualised as the improvement and construction of physical systems and facilities, including transportation, energy, water supply, and telecommunications, that help the economy and benefit society. Typically, the change is determined by examining Gross Fixed Capital Formation (GFCF), which represents the total net investment in buildings, machinery and the country's infrastructure. GFCF provides information on how much a country allocates to resources that increase economic growth (OECD, 2022). This is thus adequate to measure the performance of infrastructure investments in Nigeria, as it reflects investments made by both the government and the private sector (Adeleke & Saibu, 2021).

Comparative African Context

Inadequate infrastructure is a widespread trend across Africa. Many African economies face chronic funding deficits, poor institutional performance, and limited involvement in the development of large-scale infrastructure. For example, South Africa, a relatively developed country, also faces electricity shortages and a lack of state investment in transport infrastructure, which slows the rate of productivity growth (Eberhard et al., 2017; World Bank, 2020). On the same note, the Standard Gauge Railway and other ambitious initiatives undertaken by Kenya demonstrate the potential of infrastructure-based growth and the perils of sustaining debt (World Bank, 2019).

According to estimates from the African Development Bank (AfDB, 2018), the continent needs $130–$170 billion annually to invest in infrastructure, and there is a financing gap of approximately $68–$108 billion annually. The infrastructural deficit in Nigeria is of most significant concern, given the number of people and its resource endowment compared to those of other peer economies. Most African nations, including Ethiopia, have shown that numerous grand-scale investments in power generation and transport corridors have been associated with tremendous economic growth, albeit with growing fiscal strain (Calderón et al., 2018). Countries in West Africa, such as Ghana and Côte d'Ivoire, have increased their investments in energy and roads. However, infrastructure remains concentrated in a few efficient areas, and financing capacity is limited (Owusu-Manu et al., 2019). This relative sense reaffirms the imperative of harmonising policy towards infrastructural convergence in Nigeria with the multidimensional, multisectoral investment approach suggested by the Big Push Theory, in that capital formation should be adequate to stimulate the structural transformation required for an inclusive growth society.

EMPIRICAL LITERATURE REVIEW

Public Capital Expenditure and GFCF

Public capital spending is a key component of the Big Push Theory, which holds that extensive, well-coordinated state involvement is required to promote structural change and economic growth. It comprises various government-led infrastructure projects, ranging from roads and energy to schools and other sectors (Calderón & Servén, 2010). The significance of government-led capital investments in promoting infrastructure expansion is highlighted by numerous studies. For example, Niu and Zhao (2020) examined the impact of government investment on China's industrial transformation. Based on a Cobb-Douglas production function, the authors found that higher government spending significantly increases productivity and industrial expansion. By showing that focused investment can result in revolutionary growth in some areas, this research bolsters the Big Push theory.

Using secondary data from 1981 to 2011, Kanu and Nwaimo (2015) investigated the connection between Nigeria's GFCF and capital expenditure (CAPEX). According to the study's findings, national savings and imports positively and significantly impacted GFCF over the short and long term. At the same time, capital expenditures negatively and significantly affected GFCF in Nigeria at both the 1% and 5% significance levels. Additionally, it was noted that GFCF in the previous year was not significantly affected by its lagged value.

In a similar study, Oji and Odi (2024) used the Autoregressive Distributed Lag Model to investigate how capital expenditures affected gross fixed capital formation in Nigeria. According to the study's findings, consistent with other empirical research, there is a substantial short- and long-term correlation between public administration spending, economic services, and social and community services, and Nigeria's GFCF. The study concludes that capital expenditure and GFCF in Nigeria are significantly correlated.

Furthermore, Akujuobi et al. (2021) investigated the relationship between CAPEX and GFCF in Nigeria from 1981 to 2018. Using Ordinary Least Squares Multiple Regression, the study found a strong correlation between Nigerian CAPEX and GFCF. Based on the results, the study concluded that public spending has increased Nigeria's capital formation. As a result, it suggested that public spending on administration be monitored appropriately. Hence, it is evident from the literature that there is a positive and significant relationship between CAPEX and GFCF, particularly in Nigeria.

Foreign Direct Investment (FDI) and GFCF

According to Umeora (2013), FDI brings capital, advanced technology, and methods to countries, often boosting the creation of structures such as factories, production lines, and telecom equipment. It is widely believed that FDI helps drive capital accumulation in the economy. The study by Azolibe et al. (2020) sought to determine whether government spending on roads, transport, defence, and healthcare infrastructure is significantly associated with domestic investment and FDI in Nigeria.

The co-integration test indicated that the variables in the models follow a long-run relationship. Results from the short-run coefficients of the error-correction estimates indicate that government spending on roads, transport, defence, and health infrastructure is positively associated with investment and foreign direct investment within the country. However, the research did not find this to be significant. As a result, it was determined that government spending on infrastructure effectively stimulates investment in an economy.

Using World Bank data from 1995 to 2021, Yeboah et al. (2025) investigated how trade openness and FDI affected economic development in nine European nations. The results show that FDI has a short-term beneficial influence on economic growth but a long-term negative impact. In a similar vein, trade openness promotes near-term growth but has detrimental effects over time. Etukafia et al.'s (2024) study examined the short- and long-term effects of FDI inflows on Nigeria's GFCF growth between 1981 and 2022, using data from the Central Bank of Nigeria's 2023 statistical bulletin. The long-term coefficient finding indicates a negative relationship between GFCF and FDI. Conversely, the short-term dynamics between GFCF and FDI are incompatible.

Additionally, Emako et al. (2023) studied the impact of foreign direct investment on capital accumulation in 16 developing nations during 2005–2018. The findings demonstrated how FDI had a favourable effect on these nations' physical capital buildup and human capital formation. Similarly, for the years 1980–2020, Olowe (2022) examined how foreign direct investment affected Nigerian capital formation and found that FDI had a positive and significant impact on capital formation.

Additionally, Nyiwul and Koirala (2022) investigated how FDI affected agricultural development in 16 developing nations and found that FDI and agricultural development were positively correlated in both directions.

Furthermore, Polloni-Silva et al. (2021) examined the impact of foreign direct investment on the productivity of municipalities in the Brazilian state of São Paulo during 2010–2016. The findings revealed that FDI had a positive impact on Brazil's human capital. Djokoto (2021) also examined the impact of FDI on agricultural development in 64 nations between 1997 and 2016. The study found contradictory findings about the impact of foreign direct investment on capital accumulation. Adverse effects were observed in established economies, whereas none were observed in developing economies. Likewise, Soe (2020) examined how local investment and FDI affected Myanmar's economy from 2012 to 2017. Using a panel vector autoregressive model, the data analysis revealed that the impact of FDI varies across industries. A negligible influence was observed in the oil and gas industry; however, the effect was more substantial in the non-oil and gas industry.

Imoughele (2020) also examined how FDI affected Nigeria's industrial sector output between 1986 and 2018. The results showed a long-term correlation between industrial sector output and FDI. Similarly, Omorokunwa and Ajao (2019) investigated how FDI affected public-private investment in Nigeria. The examination of annual data from 1981 to 2016 revealed that spending has a direct, albeit slight, negative impact on investment in the long and short term. The report suggested that the government concentrate more on increasing domestic investment in Nigeria over the long run.

Official Development Assistance (ODA) and GFCF

ODA provides aid for additional capital projects in underdeveloped countries. When infrastructure is needed, and the country's own resources are limited, ODA offers easy-term loans and technical guidance. It follows the Big Push idea of using joint efforts to resolve structural problems. The relationship between ODA and GFCF has been well researched in literature. Bourguignon and Sundberg (2007) believe that project-based, capital-centred targeted aid for infrastructure delivers better results than regular aid. Kimenyi and Kholi (2011) note that aid focused on infrastructure improves the performance of fragile states like Nigeria, where public infrastructure is underdeveloped. As reported by the OECD (2020), funds for sub-Saharan Africa intended for infrastructure projects have increased fixed capital assets.

Paulin et al. (2025) examined how ODA affected both FDI and domestic investment across 30 sub-Saharan African nations between 2006 and 2019. Two linear models, one examining the impact of ODA on domestic investment and the other on FDI, were specified to accomplish this goal. The estimation results, which were derived using Parks' (1967) Realisable Generalised Least Squares (RGLS) method, demonstrate that ODA has a beneficial impact on both FDI and domestic investment in sub-Saharan African nations. Woldegiorgis (2023) also examined the relationship between inclusive development and ODA across 34 African nations from 1991 to 2018. The results of the simple OLS regression indicated that ODA and inclusive development are negatively correlated.

Dang and Duc (2019) also examined how ODA affected economic growth in 60 developing nations worldwide, using panel data from 1996 to 2016. According to this paper's key results, ODA significantly and favourably affects economic growth. Ono and Sekiyama (2023) studied the effect of ODA on FDI by assistance type, as this topic has been largely ignored in earlier research.

Five major donor nations ("France, Germany, Japan, the United Kingdom, and the United States") and sixty-three recipient nation pairs from 1996 to 2020 were examined using the Generalised Method of Moments with a gravity model. The findings imply that FDI is encouraged by ODA loans from the UK, Japan, and Germany. The study highlighted that a significant amount of their ODA loans was used to boost the production sector and economic infrastructure. Therefore, by fostering infrastructure development in recipient nations, ODA loans may attract foreign direct investment. These studies demonstrate that ODA plays a significant role in the economic expansion of underdeveloped nations.

Institutional Quality and GFCF

Different institutions determine the outcomes of money spent on public and private projects. As a result, researchers found that public spending is influenced by institutional quality (including transparency, regulatory strength, and corruption) as well as by investors' confidence in the state and their views on the success of infrastructure projects. Using the autoregressive distributed lag estimation technique, Dada and Abanikanda (2022) examine the moderating effect of institutional quality on Nigeria's FDI-led development hypothesis from 1984 to 2018. The results show that, in most models, the interaction between institutional variables and FDI has a significant impact on economic growth, suggesting that institutions play a crucial absorptive role. Thus, the authors conclude that Nigeria's growth and foreign direct investment depend on the presence of high-quality institutions.

In their investigation of the moderating role of institutional quality on the relationship between external debt and economic growth in highly indebted developing nations, Hassan and Meyer (2021) found that the adverse effects of external debt on economic growth are mitigated by institutional quality. In a similar study, Iheanacho et al. (2021) evaluated the effects of institutional quality (as measured by "the rule of law, government efficacy, regulatory quality, and corruption control") on economic performance in 12 West African nations between 1996 and 2015. The study found that all the institutional quality indicators used have a favourable and noteworthy effect on West African economic performance. Islam and Shindaini (2022) also investigated the relationship between economic growth and institutional quality in Bangladesh from 1990 to 2019. They concluded that institutional quality has a favourable long-term effect on economic growth.

Matashu and Musvoto (2020) investigated the relationships between economic growth in sub-Saharan African nations and institutional quality. They found that the composite of institutional quality indicators has a strong, statistically significant correlation with economic growth. According to Matallah and Benlahcene's (2021) investigation into the relationship between public service quality and economic growth in 15 Middle East and North Africa (MENA) countries from 1996 to 2018, the government effectiveness index significantly boosts economic growth in these nations. Nonetheless, in the chosen nations, government expenditure (or independence from the government) has a statistically negligible positive impact on economic growth.

According to Utile et al. (2021), who use annual time series data from 2001 to 2019 to investigate the impact of institutional quality on the evolution of the Nigerian economy in the twenty-first century, institutional quality significantly hinders economic progress. Likewise, Kaufmann et al. (2021) found in the Worldwide Governance Indicators project that nations with better governance perform better in infrastructure.

While research confirms that capital growth requires PCE, FDI, ODA, and a high level of IQ, studies that analyse all of these within a single framework, such as the Big Push Theory, are scarce. It is also common for research to analyse specific sectors or aspects across countries. However, there is insufficient effort to create an overview that reflects how countries collaborate on investment. This research helps resolve this difference by focusing on and assessing GFCF, following the Big Push approach, and using recent data and robust regression methods.

METHODOLOGY

Research Philosophy

The positivist research philosophy, which Saunders et al. (2019) claim is ingrained in the empirical philosophy of natural science, serves as the foundation for this study's philosophical perspective. Positivist philosophy is a school of thought that studies social issues by applying the methods of natural scientific investigation (Bryman & Bell, 2015). This scientific approach views social reality as an observable phenomenon whose existence can be established by developing ideas grounded in preexisting beliefs and testing them through scientific methods in an environment free of bias (Lincoln et al., 2011).

In this study, the positivist philosophy holds that a researcher must be kept separate from the subject of the study to conduct an objective investigation.

This method allows the researcher to address the research questions posed in this study with helpful answers or solutions. For this reason, instead of relying solely on ideas from other studies that offer opposing views on the drivers of capital formation in Nigeria through the lens of the Big Push Theory, the specific drivers will be identified. The positivist research philosophy employed in this investigation was thus influenced by the study's ontological and epistemological paradigms. According to Park et al. (2020), positivists believe their ontology is objectivist, meaning the world exists as a real entity. Because of this, the researcher believes that the drivers of capital formation in Nigeria can be studied using scientific methods, thereby revealing the truth without outside interference, enabling better generalisation.

This work assumes that accurate knowledge is attained by applying the scientific method to transform the complex world into numerical facts. This bolsters Howell's (2013) argument that positivism holds that the only way to comprehend any field of phenomena accurately is to examine individual examples of patterns. Furthermore, it is founded on quantitative research, which employs precise, statistical, and mathematical methods to produce data about a complex environment (Frey, 2018). In this case, it establishes the causal relationship between capital production and Nigeria's infrastructure development.

Research Approach

The study used a deductive approach that was grounded in positivist principles (Saunders et al., 2019). According to Trochim (2020), the deductive research approach is often called the top-down research strategy because theories help shape hypotheses about the topic under study. When comparing hypotheses and facts, this research approach assesses whether existing theories of a social phenomenon are strong.

The aim in this case is to either refute, uphold, or alter the current theoretical analysis of social phenomena while laying the groundwork for further theoretical advancement (Dudovskiy, 2009). The research topic is predicated on a conjectural theory derived from an understanding of the literature on the drivers of capital formation within Nigeria through the lens of the Big Push Theory. Since the infrastructure in Nigeria is constantly evolving, it challenges the usefulness of various theories that seek to explain it. This underscores the need for the deductive approach. Moreover, it helps gather statistical data so that the researcher can conclude from the general to the specific, which aligns with positivist beliefs (Sheppard, 2020).

Research Strategy

Since the study is about measurable relationships, it used quantitative methods to examine the relationships among macroeconomic variables that influence infrastructure development in Nigeria. The method enabled statistical testing of the hypotheses proposed by the Big Push Theory using actual figures on capital formation and related data. With quantitative methods, the reliability and generalisability of the study results is enhanced (Bryman, 2016; Saunders et al., 2019). This strategy helps recognise the main factors behind GFCF, as it is a proxy for infrastructure investment.

Research Choices

A monomethod quantitative design was employed, using numerical data from secondary sources to examine the link between infrastructure and macroeconomic drivers. Using this technique ensures the method is clear and appropriate for measuring how investment-related factors affect GFCF. With a single method, the results become more internally consistent, and the modelling steps are smoother (Creswell & Creswell, 2018). Additionally, secondary data ensures the utilisation of validated macroeconomic indicators sourced from internationally recognised databases while minimising resource expenses.

Time Horizon

The study used the period from 2000 to 2020 to examine long-term changes in infrastructure development. This period features several rounds of different policies and economic conditions, making it suitable for identifying the main features of capital formation. This longitudinal design aligns with the aim of tracking progress in infrastructural development driven by sustained investment efforts and macroeconomic factors (Saunders et al., 2019). In addition, it improves understanding of how time affects the connection between the variables.

Data Collection and Operationalisation

The study utilised information from reputable international and national sources, including the World Bank World Development Indicators (WDI), the United Nations Conference on Trade and Development (UNCTAD), the Central Bank of Nigeria (CBN), the Budget Office of the Federation, the OECD-DAC, and Transparency International. The information available from these sources is standardised and can be compared across countries, which is vital for robust analysis. Secondary data is cost-effective to obtain, spans a longer period, covers more samples, and yields better results for the procedure. Gross fixed capital formation, foreign direct investment, public capital expenditure, debt servicing, institutional quality and official development assistance are defined according to established frameworks (OECD, 2022; World Bank, 2023).

Definitions used for operations will be based on international standards for consistency, validity and reproducibility. The definitions of the variables are summarised in Table 1.

Table 1: Definitions of Variables

Variable	Conceptual Definition	Operational Definition	Measurement / Proxy	Source
Gross Fixed Capital Formation (GFCF) *(Dependent Variable)*	Total investment in fixed assets, including infrastructure, machinery, buildings, and other assets, reflects the economy's rate of physical capital accumulation.	Proxy for infrastructural development is used to capture growth in physical capital stock.	GFCF as % of GDP	World Bank (2023)
Public Capital Expenditure (PCE)	Government expenditure on important long-term projects, for example, roads, energy and similar assets	Total government capital spending relative to GDP or total budget.	Capital expenditure as % of GDP or % of total government expenditure	CBN (2020)
Foreign Direct Investment (FDI)	Cross-border investment by foreign entities to acquire a lasting interest and control in domestic enterprises.	Net FDI inflows relative to the size of the economy.	FDI inflows (USD) or as % of GDP	World Bank (2020), UNCTAD (2022)
Official Development Assistance for Infrastructure (ODA)	International aid targeted specifically at physical infrastructure, such as energy, transport, and water.	Development assistance allocated to infrastructure sectors.	% of total ODA directed to infrastructure or % of GNI	AidData (2020)
Institutional Quality / Governance (IQ)	The degree to which a country's institutions enable effective government, rule of law, transparency, and control of corruption.	Aggregated governance indicators assessing the quality of institutions.	WGI (e.g., Government Effectiveness, Rule of Law) or Corruption Perception Index (CPI)	World Bank (2020), Transparency International (2023)

Model Specification

$$GFCF_t = \beta_0 + \beta_1 PCE_t + \beta_2 FDI_t + \beta_3 ODA_t + \beta_4 IQ_t + \varepsilon_t$$

Where:
$GFCF_t$: Gross Fixed Capital Formation (as % of GDP) – Proxy for infrastructural development used to capture physical capital stock growth

PCE_t: Public Capital Expenditure (% of GDP)

FDI_t: Foreign Direct Investment inflows (USD or % of GDP)

ODA_t: Official Development Assistance (% of GNI)

IQ_t: Institutional Quality (WGI or CPI)

ε_t: Error term

β_0: This is the intercept of the model. It represents the expected value of Gross Fixed Capital Formation (GFCF) when all the independent variables (PCE, FDI, ODA, IQ) are equal to zero. It is the baseline level of infrastructure development in the absence of external influences.

β_1: This is the coefficient of Public Capital Expenditure (PCE). It measures the expected change in GFCF for a one-unit increase in PCE, holding other variables constant.

β_2: This is the coefficient of Foreign Direct Investment (FDI). It captures how much GFCF is expected to change with a one-unit increase in FDI, assuming all other variables are constant.

β_3: This is the coefficient of Official Development Assistance (ODA). It indicates the effect of a one-unit increase in infrastructure-targeted aid on GFCF.

β_4: This is the coefficient of Institutional Quality (IQ). It shows how improvements in governance or institutional quality are expected to impact GFCF.

t: The subscript *t* represents time, indicating that the model uses time-series data—typically annual data. Each variable (e.g., $GFCF_t$, PCE_t) reflects its value in a specific year *t*.

Table 2: Expected Signs of Coefficients (based on theory)

Variable	Symbol	Expected Sign	Justification
Public Capital Expenditure	β1	+	Government-led investment directly stimulates infrastructure (Big Push)
FDI Inflows	β2	+	Foreign capital promotes infrastructure expansion and private investment.
ODA for Infra-structure	β3	+	Development aid targeted at infrastructure enhances fixed investment.
Institutional Quality	β4	+	Better institutions improve policy effectiveness and investor confidence.

Statistical Tools

To examine trends and variability in the data, descriptive statistics were used to assess central tendencies, dispersion, and distributional characteristics, shedding light on the patterns and fluctuations in macroeconomic metrics from 2000 to 2020 (Gujarati & Porter, 2009). Correlation analysis was used to determine the degree and direction of linear relationships among independent variables, like PCE, FDI, and IQ. For the inferential part of the study, Fully Modified Ordinary Least Squares (FMOLS) regression was chosen, as it excels at accounting for problems of cointegration, endogeneity and serial correlation in time-series data (Phillips & Hansen, 1990). In this case, FMOLS was recommended because it reliably provides consistent results for long-term parameters when the sample size is small (Nazlioglu et al., 2011).

There are potential endogeneity issues, such as reverse causality or unmeasured behaviour. Although other econometric methods, including the Generalised Method of Moments (GMM) and the Autoregressive Distributed Lag (ARDL) model, might also be used to model dynamic relationships and explicitly address endogeneity, FMOLS was ultimately selected for this research. The reason is that the author primarily focused this research on long-run relationships rather than short-run dynamics, and the sample size was relatively small (2000-2020), which constrained the efficiency of GMM estimation. On the contrary, FMOLS is more reliable and performs better at modelling long-term parameters, given these limitations.

To ensure the regression results are reliable, several robustness tests were conducted. The Variance Inflation Factor (VIF) was used to assess whether the explanatory variables in the model are correlated and could influence the results (Kutner et al., 2004). For heteroskedasticity, the Breusch-Pagan test was used; for autocorrelation, the Durbin-Watson statistic was used, depending on how the model was specified. Next, adjusted R-squared and F-statistics were used to assess the regression model's effectiveness and significance. These tools collectively ensured the robustness, validity and clarity of the results from econometric analysis.

Ethical Considerations

For this study, data collection involved gathering secondary data from reputable sources, including the World Bank, UNCTAD, and the Central Bank of Nigeria. Since the researcher worked with data that did not include people, ethical issues such as informed consent and the protection of personal details were not present (Saunders et al., 2019). Also, the study was conducted in accordance with ethical guidelines, citing and referencing all the literature and sources used. To avoid bias, the analysis focused on hard evidence and remained unbiased throughout. All results were reported honestly, helping to build trust in the methodology used in this research (Bryman, 2016). To ensure the originality of all work handed in, the researcher adhered to the university's integrity and anti-plagiarism rules. All these ethical principles strengthen the research and make it more credible.

RESULTS INTERPRETATION AND DISCUSSION OF FINDINGS

Descriptive statistics and diagnostic analysis

Trend analysis

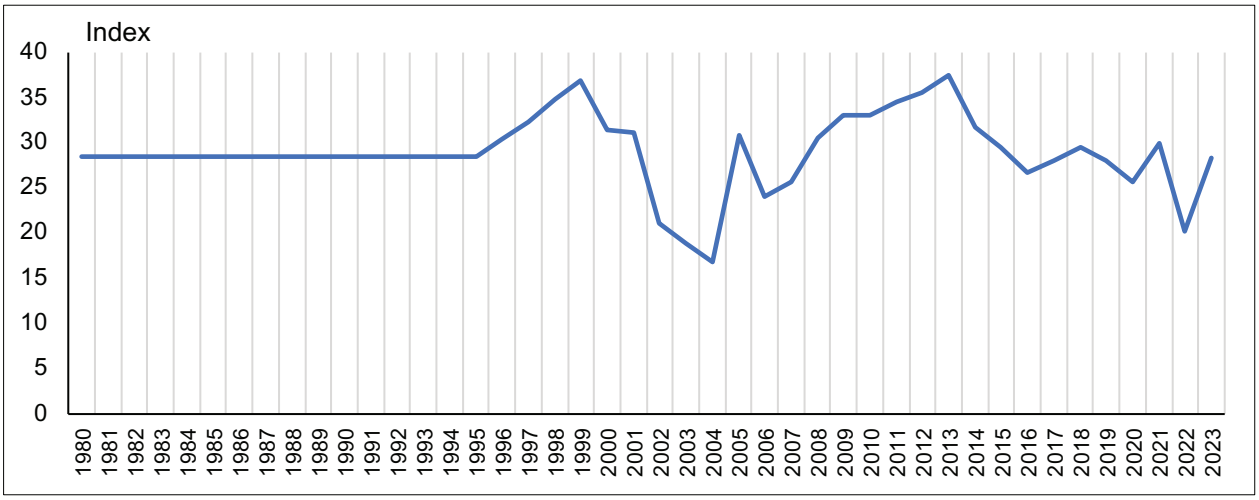


Figure 1: Institutional Quality (IQ)

Source: Author's Computation (2025) from data extracted from the World Bank database (2020, 2023a, 2023b).

From Figure 1, Institutional Quality (IQ) in Nigeria exhibited a largely stagnant trend during the early years of the study period, with values remaining around 28.46 between 1980 and 1995. This long-standing flatness in institutional development suggests a bureaucratic, possibly dysfunctional governance structure that failed to evolve significantly over a decade and a half.

From the perspective of the Big Push Theory, which advocates a coordinated, large-scale investment effort to break the cycle of underdevelopment, such institutional inertia would have impeded the effective implementation of infrastructure projects, as sound institutions are critical for resource allocation, project execution, and contract enforcement.

A notable shift occurred in the late 1990s, with IQ rising to 36.85 in 1999. This surge coincided with Nigeria's return to democratic governance, which may have brought a renewed focus on public accountability, regulatory reforms, and institutional rebuilding. However, this momentum was not sustained. The early 2000s saw a drastic drop in institutional quality, reaching a low of 16.92 in 2004. This regression highlights periods of policy inconsistency and possible governance lapses that could undermine investor confidence and limit capital inflows, thus stalling the capital formation process necessary for infrastructure development.

Although there was a modest recovery from 2005 to 2013, peaking again at 37.44 in 2013, the IQ indicator remained volatile in subsequent years, falling to a low of 20.28 in 2022 before recovering to 28.30 in 2023. This volatility signals persistent institutional fragility and governance instability, with adverse effects on the sustainability and efficiency of infrastructure investments.

Under the Big Push framework, institutions are expected to play a coordinating role by aligning public and private sector efforts in large-scale investments. In Nigeria's case, inconsistent institutional quality likely disrupted this coordination, limiting the transformative potential of capital inflows from foreign direct investment and official development assistance.

Overall, Nigeria's institutional quality pattern reflects a challenging environment for infrastructure development. Despite periods of improvement, the inability to maintain strong, consistent institutions undermines the very foundation upon which a successful Big Push strategy must rest. Without durable reforms that ensure institutional stability and effectiveness, large-scale capital formation efforts are likely to fall short of triggering sustained economic transformation.

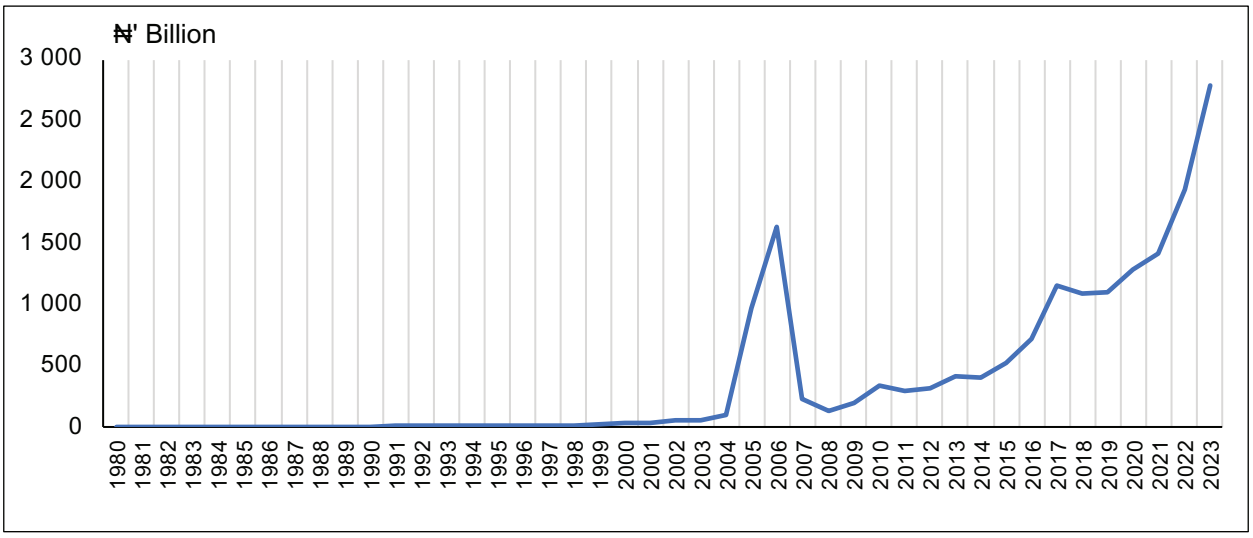


Figure 2: Net Official Development Assistance (ODA)

Source: Author's Computation (2025), World Bank (2020, 2023a, 2023b)

From Figure 2, Net Official Development Assistance (ODA) to Nigeria remained negligible throughout the 1980s and early 1990s, with annual inflows below ₦10 billion.

This low level of external support during the structural adjustment era reflected the country's weak international creditworthiness, political instability, and strained diplomatic relations. Under the Big Push Theory, external aid plays a critical role in bridging the financing gap for developing countries that are unable to generate sufficient domestic savings to support large-scale infrastructure projects. Nigeria's minimal ODA receipts during this period likely constrained its ability to implement such transformative investments.

Beginning in the late 1990s and early 2000s, ODA flows increased, reaching ₦54.85 billion in 2002 and rising further to ₦95.44 billion in 2004. The most dramatic surge occurred between 2005 and 2006, when Nigeria received ₦965.17 billion and ₦1,639.20 billion, respectively. This spike is likely associated with the global push for debt relief and poverty reduction strategies, including Nigeria's Paris Club debt forgiveness in 2005.

While this represented a historic opportunity to channel massive resources into infrastructure, the subsequent years suggest that much of the aid may not have been efficiently deployed. Despite continued high levels of ODA—often exceeding ₦1 trillion annually after 2016—there is limited evidence of a proportionate rise in Gross Fixed Capital Formation, suggesting inefficiencies in public investment management or the diversion of aid toward non-capital expenditures.

From 2017 to 2023, ODA continued to rise, peaking at ₦2.79 trillion in 2023. However, this persistent growth in aid inflows did not yield commensurate improvements in capital formation metrics. This discrepancy raises critical questions about absorptive capacity, fiscal governance, and project selection in Nigeria. According to the Big Push framework, foreign assistance should act as a catalyst for large-scale, coordinated investments across complementary sectors to overcome development bottlenecks. In Nigeria's case, the weak linkage between high ODA and gross capital formation suggests that the aid may have been fragmented, poorly targeted, or undermined by weak institutions and corruption.

In summary, while the volume of ODA to Nigeria has grown substantially, especially in the last two decades, its effectiveness in driving capital formation and infrastructural development remains questionable. The country's experience underscores a key critique of the Big Push Theory: that without strong institutions, strategic planning, and accountability, even large injections of external financing may fail to produce the desired developmental outcomes.

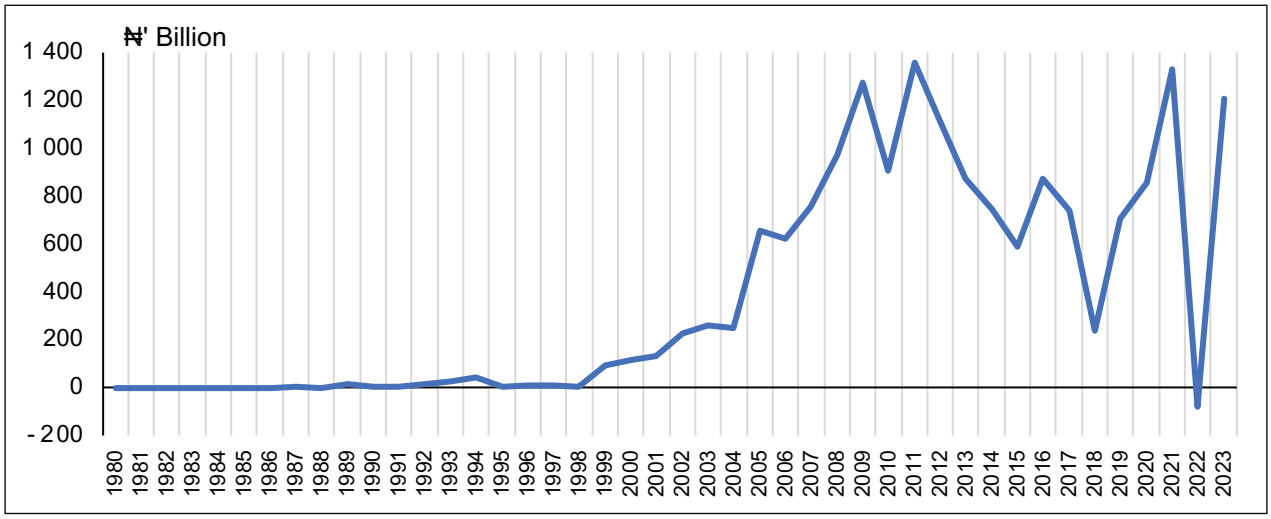


Figure 3: Foreign Direct Investment (FDI)

Source: Author's Computation (2025), World Bank (2020, 2023a, 2023b)

From Figure 3, Foreign Direct Investment (FDI) net inflows in Nigeria were minimal and erratic in the early part of the study period. From 1980 to the early 1990s, annual FDI inflows remained below ₦10 billion, with Nigeria even recording a net outflow of ₦0.41 billion in 1980. These low levels of FDI reflect a combination of macroeconomic instability, regulatory uncertainty, and weak infrastructure—all of which deter long-term investor commitment.

Under the Big Push Theory, FDI is a crucial mechanism for overcoming capital scarcity, promoting technology transfer, and enabling infrastructural development. Nigeria's inability to attract sustained FDI during this period highlights a failure to meet the necessary preconditions for large-scale external investment.

A turning point emerged in the mid-1990s, with FDI inflows rising significantly, reaching ₦92.79 billion in 1999 and ₦115.96 billion in 2000. This period coincided with economic liberalisation policies and the transition to democratic governance, which improved investor sentiment. From 2001 to 2011, Nigeria witnessed a steady and substantial increase in FDI, culminating in a peak of ₦1,360.29 billion in 2011.

Investments in the oil and gas sector, telecommunications, and banking reforms largely drove these flows. During this phase, the rise in FDI was more closely aligned with increased Gross Fixed Capital Formation, suggesting that external investment played a tangible role in driving capital accumulation and infrastructural expansion.

However, the post-2011 period was marked by volatility and a gradual decline in FDI inflows. By 2018, inflows had dropped to ₦237.29 billion—down from over ₦1 trillion just a few years prior. In 2022, Nigeria recorded a net disinvestment of ₦79.57 billion, reflecting growing investor apprehension over exchange rate instability, policy reversals, security concerns, and regulatory unpredictability. Although Nigeria recovered to ₦1,208.13 billion in 2023, the preceding instability underscores the fragility of its investment climate.

These fluctuations limit the catalytic role FDI can play in a Big Push strategy. For FDI to contribute meaningfully to capital formation and infrastructure development, it must be stable, sectorally diversified, and supported by a conducive investment environment. Nigeria's experience shows that without consistent policy and institutional reform, FDI becomes opportunistic and short-term, with limited structural impact. Moreover, the concentration of FDI in extractive sectors limits its potential to stimulate broad-based infrastructural development.

In essence, while Nigeria has experienced periods of strong FDI inflows, particularly during the 2000s, the lack of continuity and sectoral breadth restricts its effectiveness as a driver of sustainable capital formation. The Big Push Theory underscores the importance of sustained and coordinated investment flows—conditions that have not been fully met in Nigeria's FDI landscape.

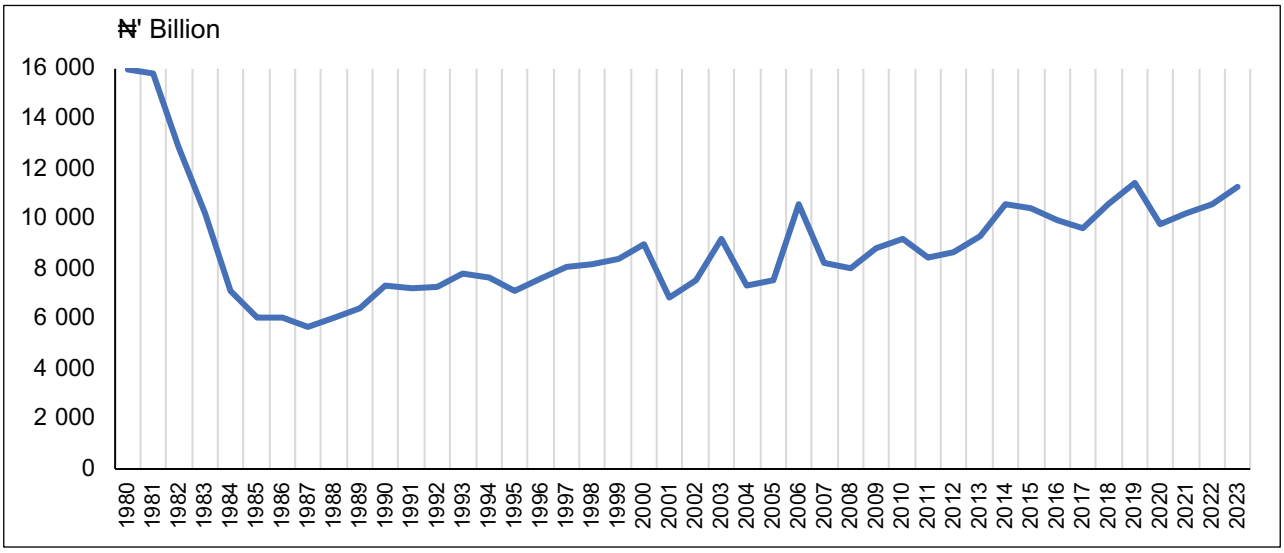


Figure 4: Gross Fixed Capital Formation (GFCF)

Source: Author's Computation (2025), World Bank (2020, 2023a, 2023b)

From Figure 4, Gross Fixed Capital Formation (GFCF), a key indicator of investment in physical assets such as infrastructure, machinery, and buildings, showed a fluctuating but generally sluggish growth trend in Nigeria over the study period. In the early 1980s, GFCF stood at ₦15,996.38 billion in 1980 but began to decline steadily, reaching a low of ₦6,032.26 billion in 1985. This contraction reflected the impact of Nigeria's economic crisis during the oil glut and structural adjustment era, when fiscal austerity, inflation, and currency devaluation constrained public and private investment. Under the Big Push Theory, which emphasises the need for a significant, coordinated increase in capital investment to overcome development traps—such a contraction in GFCF reflects an environment far from the threshold needed for transformative growth. During the late 1980s and early 1990s, GFCF remained relatively stagnant, fluctuating between ₦5,668.87 billion and ₦8,385.96 billion, despite marginal improvements in foreign aid and FDI.

This stagnation implies that capital inflows were either insufficient or poorly utilised, further reinforcing the theory's concern with the need for strategic coordination in investment efforts. Notably, between 2000 and 2010, GFCF improved moderately, peaking at ₦10,557.89 billion in 2006.

This uptick coincided with the global commodity boom, debt relief gains, and macroeconomic stabilisation, all of which provided the fiscal space and investor confidence to scale up infrastructure-related spending. However, the gains were not sustained consistently, as GFCF figures hovered around ₦8,000–₦9,000 billion for much of the subsequent decade.

From 2011 to 2023, GFCF grew slowly and erratically, reaching ₦11,250.11 billion in 2023. While this increase is notable, it pales in comparison to the massive rise in government capital expenditure and official development assistance during the same period.

The weak responsiveness of GFCF to these large inflows suggests structural inefficiencies in public investment management, low absorptive capacity, and possibly corruption-related leakages or project delays. For a Big Push strategy to succeed, capital formation must rise significantly and translate into productive infrastructure that supports industrialisation and diversification. Nigeria's GFCF trajectory shows that while nominal figures have grown, the scale and pace of investment have been insufficient to trigger the threshold effects proposed by the theory.

Furthermore, the lack of sustained acceleration in GFCF indicates that Nigeria has not experienced the kind of coordinated and sectorally integrated investment wave that Big Push advocates. Instead, capital formation appears fragmented and cyclical, often tied to volatile oil revenues and short-lived policy initiatives. Without a long-term capital formation strategy anchored in institutional strength and coherent planning, the potential of public and private investment to catalyse infrastructure-led development remains underutilised.

In conclusion, Nigeria's pattern of GFCF reflects a missed opportunity to convert financial inflows into sustained, strategic investment. This undermines the practical application of the Big Push framework and signals the urgent need for reform in capital project planning, execution, and monitoring.

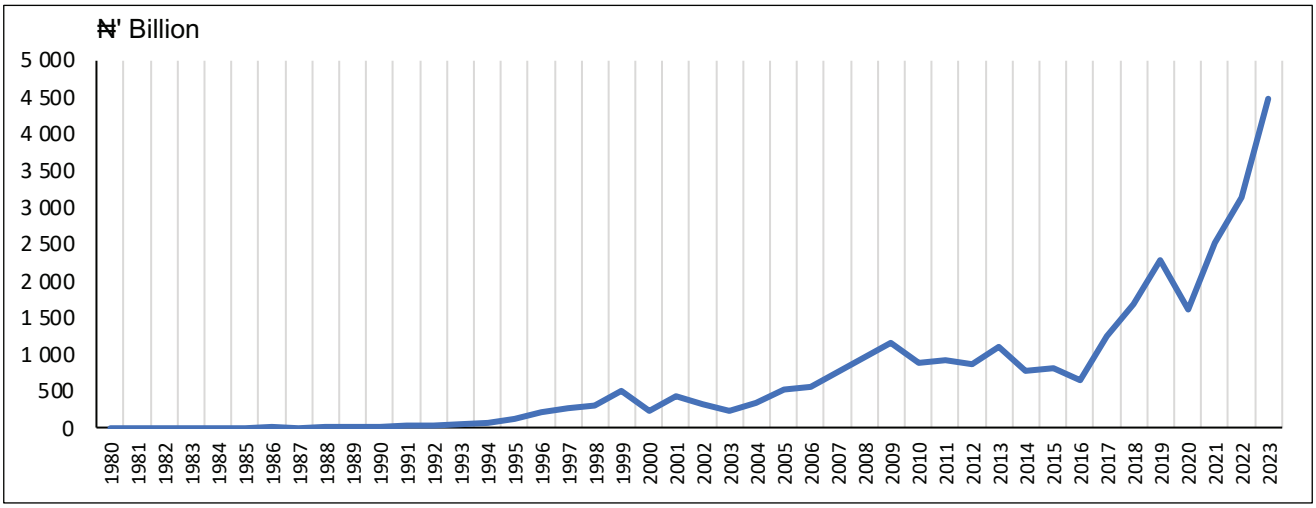


Figure 5: Total Federal Government Capital Expenditure (PCE)

Source: Author's Computation (2025), World Bank (2020, 2023a, 2023b)

From Figure 5, Total Federal Government Capital Expenditure (PCE), which represents direct government investment in infrastructure and other fixed assets, presents a compelling but complex narrative in Nigeria's development trajectory. In the early years of the study (1980–1990), PCE was remarkably low, starting at just ₦5.38 billion in 1980 and reaching only ₦24.05 billion by 1990.

This low level of capital expenditure limited the government's ability to stimulate foundational infrastructure in the transportation, energy, and health sectors, which are critical for breaking out of underdevelopment traps, as posited by the Big Push Theory. During this period, budgetary constraints, debt crises, and the structural adjustment program significantly curtailed the government's developmental role.

The 1990s and early 2000s witnessed a gradual increase in PCE, particularly from 1999 onwards, where expenditure rose sharply from ₦498.03 billion in 1999 to ₦965.17 billion in 2005. This growth was primarily driven by the return to democratic rule, rising oil revenues, and the adoption of national development strategies to rebuild infrastructure and public services. These years signalled a potential shift toward the large-scale investment framework proposed by the Big Push Theory, in which coordinated and sustained government spending is used to overcome infrastructural bottlenecks and stimulate complementary private-sector investment.

From 2006 to 2015, PCE maintained an upward trend, reaching ₦818.35 billion in 2015. However, the increase was neither linear nor proportional to the country's needs, with noticeable fluctuations due to changes in oil prices, political cycles, and budget implementation challenges. A critical observation is that despite rising government expenditures, GFCF and other real economy indicators did not increase at the same rate. This discrepancy suggests inefficiencies in translating capital budgets into actual infrastructure assets—likely due to corruption, cost overruns, and poor procurement practices.

The most dramatic surge in PCE occurred between 2016 and 2023, with expenditure increasing from ₦653.61 billion in 2016 to a record high of ₦4,486.21 billion in 2023. This period corresponds with renewed government emphasis on capital budgeting, infrastructure revival, and economic diversification. While these efforts align with the Big Push approach in terms of scale, the critical issue lies in execution quality and sustainability. The lack of corresponding growth in GFCF and the continued volatility in foreign investment suggest that much of this spending may not have generated the complementary and synergistic effects required to trigger a self-sustaining growth trajectory. In essence, although Nigeria has made substantial fiscal commitments to capital expenditure, particularly in the past two decades, the outcomes have fallen short of expectations. The Big Push Theory emphasises that large-scale investments must be well-coordinated, mutually reinforcing, and underpinned by strong institutions.

In Nigeria's case, the disconnect between increased capital spending and infrastructural transformation highlights systemic weaknesses in budget discipline, project delivery, and institutional quality. Without addressing these structural challenges, even significant public investments may fail to achieve the threshold effects necessary for sustained economic transformation.

Table 2: Descriptive statistics

	Foreign direct investment net inflows (₦' Billion)	Gross Fixed Capital Formation (₦' Billion)	Institutional Quality (IQ)	Net official development assistance received (₦' Billion)	Total Federal Government Capital Expenditure (₦' Billion)
	FDI	GFCF	IQ	ODA	PCE
Mean	385.76	8 907.94	28.93	392.90	687.46
Median	124.19	8 405.86	28.53	42.22	336.31
Maximum	1 360.29	15 996.38	37.44	2 794.57	4 486.21
Minimum	-79.57	5 668.87	16.92	0.05	4.10
Std. Dev.	458.70	2 252.26	4.19	634.94	933.74
Skewness	0.76	1.30	-0.65	1.95	2.22
Kurtosis	2.11	5.15	4.26	6.52	8.36
Sum	1 6973.36	391 949.40	1 272.82	17 287.47	30 248.07
Observations	44	44	44	44	44

Source: World Bank, Author's Calculations (2025)

The descriptive statistics in Table 2 provide insights into the distribution, central tendency, and variability of key drivers of capital formation in Nigeria from 1980 to 2023. Foreign Direct Investment (FDI) exhibits a mean of ₦385.76 billion and a median of ₦124.19 billion, indicating a positively skewed distribution (skewness = 0.76) with a few exceptionally high values pulling the average upward.

The minimum FDI value of ₦79.57 billion suggests a net disinvestment in at least one year, reflecting periods of investor withdrawal. The standard deviation of ₦458.70 billion shows considerable variability in FDI inflows, underlining their volatility and sensitivity to Nigeria's political and economic climate.

Gross Fixed Capital Formation (GFCF) has the highest mean value among the variables at ₦8,907.94 billion, reflecting its central role in capital accumulation and economic growth. The standard deviation of ₦2,252.26 billion and a maximum of ₦15,996.38 billion suggest wide variations in annual investment in fixed assets, possibly driven by macroeconomic cycles, fiscal policy shifts, and external shocks such as oil price fluctuations. With a skewness of 1.30 and kurtosis above 5, GFCF is both right-skewed and leptokurtic, indicating occasional large values and a distribution with heavier tails than a normal distribution. Institutional Quality (IQ) has a mean of 28.93 and a relatively low standard deviation of 4.19, suggesting gradual change over the study period. The variable is slightly negatively skewed (skewness = -0.65), indicating that higher-quality institutions were less common, with most values clustered toward the higher end of the scale.

The kurtosis of 4.26 further implies a somewhat peaked distribution. This stability (or stagnation) in institutional quality may have limited Nigeria's capacity to effectively mobilise and manage large-scale investments—a key requirement under the Big Push framework.

Official Development Assistance (ODA) shows a mean of ₦392.90 billion, but the extremely high skewness (1.95) and kurtosis (6.52) point to significant outliers. While the median is only ₦42.22 billion, the maximum of ₦2,794.57 billion reflects a few exceptional years of large aid inflows. This indicates that although Nigeria has occasionally received substantial ODA, it is not a consistently reliable source of capital, and its impact on capital formation is likely to depend on external donor conditions and short-term global trends rather than on long-term national development strategies.

Total Federal Government Capital Expenditure (PCE) exhibits the highest skewness (2.22) and kurtosis (8.36), reflecting a highly non-normal distribution with a few years of extremely high spending. With a mean of ₦687.46 billion and a median of ₦336.31 billion, recent years of elevated capital budgets have significantly lifted the average. However, the substantial standard deviation (₦933.74 billion) again indicates inconsistent and irregular investment patterns. This inconsistency undermines the coordinated, large-scale public investment push envisioned by the Big Push Theory and points to governance and execution challenges in Nigeria's fiscal management.

Table 3: Correlation matrix

Correlation matrix	*FDI*	*GFCF*	*IQ*	*ODA*	*PCE*
Foreign direct investment net inflows	1.00				
Gross Fixed Capital Formation	0.18	1.00			
Institutional Quality	0.25	-0.04	1.00		
Net official development assistance received	0.51	0.34	-0.19	1.00	
Total Federal Government Capital Expenditure	0.59	0.32	-0.05	0.89	1.00

Source: Author's Computation (2025)

The correlation matrix in Table 3 reveals the strength and direction of linear relationships between the key drivers of capital formation. Foreign Direct Investment (FDI) shows a moderate positive correlation with Gross Fixed Capital Formation (GFCF) (r = 0.18), suggesting that while FDI contributes to capital formation, the relationship is relatively weak. This could reflect Nigeria's difficulty in converting foreign capital into long-term productive assets due to infrastructure deficits or institutional bottlenecks.

FDI also shows a positive relationship with Institutional Quality (r = 0.25), indicating that better institutions may slightly enhance investor confidence.

Institutional Quality (IQ), however, exhibits a very weak negative correlation with GFCF (r = -0.04) and a negative correlation with both ODA (r = -0.19) and PCE (r = -0.05).

These results are concerning, as they suggest that improvements in institutional quality have not necessarily aligned with increased public or donor investment. This mismatch implies potential governance issues—where inflows of capital or aid are not effectively managed or allocated in line with institutional strength, thereby undermining the coordination principle of the Big Push Theory. Official Development Assistance (ODA) shows a strong positive correlation with PCE (r = 0.89) and a moderate positive correlation with GFCF (r = 0.34). This indicates that donor funding has historically supported public capital expenditure and, to some extent, capital formation. However, the high correlation with PCE suggests that ODA may be substituting rather than complementing domestic investment efforts. For the Big Push to be effective, external aid should work in tandem with government spending to achieve critical mass in infrastructure investment.

Total Federal Government Capital Expenditure (PCE) shows the strongest correlation with FDI (r = 0.59) and a moderate correlation with GFCF (r = 0.32). These relationships imply that increased public capital spending has some catalytic effects on attracting foreign investment and boosting capital formation, as predicted by the Big Push Theory. However, the moderate strength of these relationships also underscores that simply increasing public spending is insufficient; efficiency, coordination, and institutional capacity matter significantly.

In summary, while there are positive linkages between some key variables, the relatively weak correlations—especially between institutional quality and the core drivers—indicate that governance issues and poor policy coherence constrain Nigeria's path to a Big Push-style development. Strengthening institutions and improving public investment efficiency are crucial for capital inflows and public expenditure to translate effectively into sustainable infrastructural development.

Table 4: Fully Modified Ordinary Least Squares (FMOLS) regression

Dependent Variable: GFCF

Method: Fully Modified Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF (-1)	0.69	0.03	24.94	0.00***
PCE	-0.26	0.13	-2.05	0.05**
FDI	0.14	0.14	0.97	0.34
ODA	1.11	0.18	6.07	0.00***
IQ	29.95	13.41	2.23	0.03**
Constant	1 452.08	459.40	3.16	0.00***
R-squared		0.73		
Adjusted R-squared		0.69		
S.E. of regression		936.42		
Long-run variance		105 961.20		
Mean dependent var		8 575.32		
S.D. dependent var		1 681.12		
Sum squared resid		31 567 880		

*** means statistically significant at the 5% level (p < 0.05); *** means statistically significant at the 1% level (p < 0.01), GFCF = Gross Fixed Capital Formation, PCE = Total Federal Government Capital Expenditure, FDI = Foreign Direct Investment Net Inflows, ODA = Net Official Development Assistance Received, IQ = Institutional Quality (Index).*

Source: Author's Computation (2025)

From the FMOLS estimation results in Table 4, it can be established that GFCF (-1) (the lag of Gross Fixed Capital Formation) has a positive and statistically significant impact on current GFCF at the 1% significance level (b = 0.69, p-value = 0.00). This indicates strong path dependency, in which past levels of capital formation significantly influence current investments. Specifically, a ₦1 billion increase in past GFCF leads to approximately a ₦0.69 billion increase in current GFCF. This result reinforces the cumulative nature of capital formation in line with the Big Push Theory—sustained investment is essential to build momentum for infrastructural development.

Public Capital Expenditure (PCE) shows a negative and statistically significant relationship with GFCF at the 5% level (b = -0.26, p = 0.05). Contrary to expectations, a ₦1 billion increase in public capital expenditure is associated with a ₦0.26 billion decrease in GFCF. This counterintuitive result may imply inefficiencies, misallocation, or corruption in public spending, in which capital budgets do not effectively translate into productive investments. For the Big Push to succeed, the quality—not just the quantity—of public expenditure must be improved.

Foreign Direct Investment (FDI) has a positive but statistically insignificant impact on GFCF (b = 0.14, p = 0.34). Although the coefficient suggests that a ₦1 billion increase in FDI could raise GFCF by ₦0.14 billion, the relationship is not statistically strong. This implies that FDI inflows have not consistently translated into long-term capital formation in Nigeria, possibly due to capital flight, repatriation of profits, or the concentration of investment in sectors with low fixed asset formation (such as oil and gas).

Official Development Assistance (ODA) has a positive and highly significant impact on GFCF at the 1% level (b = 1.11, p = 0.00). This means that a ₦1 billion increase in ODA inflows results in about a ₦1.11 billion increase in GFCF. The implication is that donor funding has been more effective than domestic public spending in boosting capital formation, possibly because of better project execution, stronger external oversight, or targeted infrastructure support. This underscores the relevance of external coordination and funding for Nigeria's infrastructural development under the Big Push framework.

Institutional Quality (IQ) also has a positive and statistically significant effect on GFCF at the 5% level (b = 29.95, p = 0.03). This result indicates that improvements in institutional quality—such as rule of law, regulatory quality, and governance—are associated with higher capital formation. A one-unit improvement in the institutional quality index corresponds to an increase of approximately ₦29.95 billion in GFCF. This reinforces the importance of institutions in coordinating and sustaining the large-scale investment needed for a Big Push.

Overall, the model is robust, with an R-squared of 0.73, meaning that the independent variables explain 73% of the variation in GFCF. The results highlight the importance of historical investment momentum, institutional quality, and foreign aid, while also pointing to inefficiencies in public spending and weak integration with FDI. These findings suggest that for Nigeria to pursue a Big Push development strategy effectively, attention must be given not only to mobilising funds but also to institutional reform and investment quality.

Standard Error of the Regression (S.E. = 936.42): This indicates the average distance that the observed values fall from the regression line. A standard error of ₦936.42 billion suggests moderate variability around the predicted values of Gross Fixed Capital Formation (GFCF). While not excessively large relative to the mean GFCF (₦8575.32 billion), this still suggests that some external shocks or unaccounted factors may be influencing capital formation. In Big Push theory terms, it implies that while the model explains a substantial portion of the variation, coordination failures or infrastructure gaps may introduce noise into the investment process.

Long-run Variance (105,961.20): This statistic reflects the variance of the residuals over the long term. A relatively high long-run variance implies that, despite the long-run cointegrating relationships captured by the FMOLS, the data still exhibits substantial volatility. This can be attributed to economic instability, policy reversals, or inconsistent investment flows, which are critical barriers in sustaining a Big Push-type strategy that relies on steady, large-scale investments.

Robustness Tests

Table 5: Multicollinearity: VIF

Variance Inflation Factors			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
GFCF (-1)	0.00	24.24	1.17
PCE	0.02	8.98	5.63
FDI	0.02	3.07	1.72
ODA	0.03	7.56	5.33
IQ	179.84	61.02	1.28

Source: Author's Computation (2025)

The multicollinearity test using Variance Inflation Factors (VIF) in Table 5 indicates that there is no serious multicollinearity issue among the independent variables in the FMOLS regression model. The centred VIF values for all variables are below the threshold of 10, indicating that the explanatory variables contribute distinct information to the model without excessive overlap. This supports the reliability of the coefficient estimates.

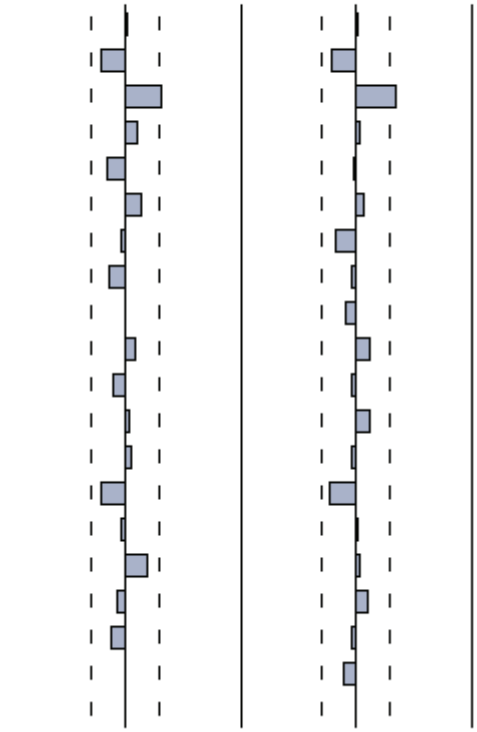
Specifically, the lagged Gross Fixed Capital Formation (GFCF (-1)) shows a very low centred VIF of 1.17, confirming it is an independent and important predictor in the model. Public Capital Expenditure (PCE) and Net Official Development Assistance (ODA) have moderately higher centred VIFs, around 5.3-5.6, suggesting some correlation but at acceptable levels that do not undermine the model's integrity. Foreign Direct Investment (FDI) and Institutional Quality (IQ) have low-centred VIFs, indicating minimal multicollinearity with other variables.

While uncentered VIF values for some variables appear high, these are less reliable in the presence of a constant term, so the centred VIFs provide a more accurate assessment. Overall, the absence of significant multicollinearity means the FMOLS model estimates are robust, and the individual effects of the variables on capital formation can be interpreted with confidence.

In the context of the Big Push Theory and Nigeria's infrastructural development, this result strengthens the validity of the key findings. It ensures that the positive roles of institutional quality, official development assistance, and other drivers of capital formation are not distorted by overlapping explanatory power, thereby highlighting their unique and significant contributions to Nigeria's investment landscape.

Autocorrelation

Q-statistic probabilities adjusted for 1 dynamic regressor



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.022	0.022	0.0226	0.881
		2	-0.213	-0.214	2.1242	0.346
		3	0.336	0.363	7.4716	0.058
		4	0.114	0.028	8.1021	0.088
		5	-0.159	-0.024	9.3576	0.096
		6	0.133	0.073	10.272	0.114
		7	-0.035	-0.173	10.338	0.170
		8	-0.155	-0.044	11.649	0.168
		9	-0.002	-0.097	11.649	0.234
		10	0.097	0.126	12.192	0.272
		11	-0.106	-0.044	12.859	0.303
		12	0.026	0.117	12.902	0.376
		13	0.058	-0.032	13.118	0.439
		14	-0.228	-0.244	16.534	0.282
		15	-0.027	0.013	16.583	0.344
		16	0.194	0.038	19.248	0.256
		17	-0.075	0.109	19.663	0.292
		18	-0.121	-0.033	20.784	0.290
		19	0.006	-0.113	20.787	0.349
		20	0.005	-0.005	20.789	0.410

Figure 5: Autocorrelation (ACF) and Partial Autocorrelation (PACF) diagram

Source: Author's Computation (2025)

The autocorrelation Q-statistics in Figure 5 assess whether residuals from your FMOLS regression are serially correlated up to 20 lags. Serial correlation violates classical regression assumptions and can bias standard errors, affecting inference reliability. Across all lags from 1 to 20, the Q-statistic p-values are well above the commonly used significance levels (0.01, 0.05, 0.10). The lowest p-value observed is around 0.058 at lag 3, which is still marginally above the 5% significance threshold.

The autocorrelation test results indicate no significant presence of serial correlation in the residuals of the FMOLS regression model, as all Q-statistic p-values exceed the 5% significance threshold across 20 lags. This means the null hypothesis of no autocorrelation cannot be rejected, confirming that the model's error terms are independent over time. This absence of autocorrelation ensures that the model meets an important assumption for valid regression analysis, implying that the estimated coefficients and their standard errors are unbiased and reliable.

Consequently, the dynamic relationships between Gross Fixed Capital Formation and its key drivers—such as Institutional Quality, Official Development Assistance, and Public Capital Expenditure—are accurately captured. In relation to the study on Nigeria's infrastructural development and the Big Push Theory, these results enhance confidence in the robustness of the model and support the validity of the inferences drawn. The findings can therefore be used to inform policy and investment strategies with assurance that time-related dependencies in the data do not distort them.

CONCLUSION AND POLICY RECOMMENDATIONS

Recap of key findings

The study's findings have provided valuable insights into the drivers of capital formation in Nigeria. The findings revealed important trends in the variables driving capital growth in Nigeria. Irregular fluctuations in FDI highlight the challenges posed by Nigeria's volatile political and economic climate. GFCF is the most variable, with a high mean of ₦8,907.94 billion and a right-skewed, leptokurtic distribution, suggesting significant economic changes and policy decisions. IQ showed little change, and its connection to other capital drivers is weak, suggesting that governance issues are an obstacle to attracting capital. Despite ODA's volatility, it showed a strong relationship with PCE and a moderate one with GFCF, suggesting donor funds may often replace funds from the country itself. PCE shows that public spending is inefficient because it is highly inconsistent and only moderately correlated with GFCF.

These patterns are also evident in the FMOLS regression results. The findings show that GFCF (-1) plays an important role in making capital growth over time. Unexpectedly, PCE leads to lower development, showing that public investment is not being executed properly.

FDI still has a significant impact, although the statistical results failed to demonstrate a meaningful role in increasing capital over time. Better targeting of ODA seems to have made it a significant force in driving up GFCF. The findings also showed that good IQ levels help improve GFCF, emphasising the importance of strong governance.

A large standard error and high temporal variance indicates that the economy struggles with unexpected events and problems in organising effectively. Overall, although improved by investments in infrastructure, donations, and institutional progress, Nigeria's Big Push plan is hampered by weak and ineffective spending decisions and poor policy coordination, so more reform and better planning are necessary.

Policy Suggestions

A variety of policies should be used to support capital growth and economic growth in Nigeria. First, increasing spending on PCE and improving its coordination is necessary. Current public investment is not working well, so improving project selection, execution, and accountability can yield better results. Establishing effective teamwork among ministries and agencies reduces duplication and waste, thereby supporting the country's broader development. In addition, the country should strive to receive more useful FDI. FDI policies should aim to support local workers' skills, help develop technologies, connect local industries, and ensure FDI is of high quality. Also, stronger monitoring frameworks can reveal the true impact of FDI on building long-term capital and on growing the economy, enabling policy changes when required.

Furthermore, ODA funds should focus on infrastructure sectors that deliver rapid, significant results, for example, transport, energy, and telecommunications. Proper use of donor funds can supplement domestic investments and encourage private-sector investment. Officials should work closely with development groups to ensure that aid supports projects that lead to broader economic growth and ongoing benefits. Lastly, improving the rules and organisations that direct development is significant. The study points out that strong institutions make it easier for companies to raise capital. Therefore, measures taken to expose information, control corruption and improve regulatory work will encourage investment. Efforts should also be made to reinforce the system of laws, enhance how money is handled in the public sector and increase the ability of institutions to lead on large building projects.

Limitations of the Study

Certain limits of the study must be recognised. Firstly, the annual aggregate data may mask differences in capital formation across industries and regions. In addition, it is not always possible to fully measure variables like institutional quality, and they may not capture all the factors that make a government effective. Also, because the research covers the period up to 2023, it does not include recent changes or major disruptions. Moreover, because of possible endogeneity, it is not definite that one variable causes the other.

Directions for Future Research

Future studies should use disaggregated data to examine capital formation processes across industries and regions. Also, adding qualitative reviews to institutional reforms can improve knowledge about how governance improves.

Furthermore, applying suitable methodologies, such as panel data or structural models, can make it easier to determine the impact and connections among FDI, ODA, and investment. Lastly, studying the role of modern progress, such as digital networks and financing climate projects, will provide valuable insights for creating contemporary policies.

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